DESIGN REPORT
OCTOBER 2013

STATE PROJECT NO. *0170-2875*
FEDERAL AID PROJECT NO. *N/A*
LIST 21 CULVERT REHABILITATION ON I-395
TOWNS OF *THOMPSON & MONTVILLE*

TOWN: Thompson and Montville

ROUTES: I-395 (Principal Arterial – Interstate)

DISTRICT NO.: 2

FINAL MAINTENANCE RESPONSIBILITY: State of Connecticut

LOCATION:

The work at the Thompson site involves the rehabilitation of two culverts under I-395, between Interchange Nos. 98 and 99. ConnDOT Structure Nos. 06703 and 06704, located at approximate log mile 49.5 on I-395, carry an unnamed tributary to French River.

The work at the Montville site involves the rehabilitation of two culverts under I-395, just south of Interchange No.78. ConnDOT Structure Nos. 06731 and 06732, located at approximate log mile 5.2 on I-395, carry an unnamed tributary to the Sandy Brook.

DESCRIPTION OF PROJECT:

Thompson Site:

Both existing culverts are single span corrugated steel pipes.

Structure No. 06703, under I-395 Southbound, is a 96-in diameter culvert, 170-ft in length. The October 2012 inspection performed on the culvert identified several deficiencies. Undercutting is present along the embankment upstream and downstream. The lower plates of the culvert have perforations and heavy laminar rust. There is vertical and horizontal deformation in the culvert.

The overall rating of the culvert for Structure Number 06703 is 3.

Structure Number 06704, under I-395 Northbound, is an 84-in diameter culvert, 194-ft in length. The October 2012 inspection performed on the culvert identified several deficiencies. Undercutting is present along the embankment upstream and downstream. The corner and bottom plates of the culvert have perforations and heavy laminar rust. There is vertical and horizontal deformation in the culvert.

The overall rating of the culvert for Structure Number 06704 is 2.

This project will include steel pipe rehabilitation and riprap channel repair for both culverts. Both structures will be sliplined with a Corrugated Steel Pipe Aluminized Type 2 (10 Gauge). The annulus between the host pipe and the new liner will be grouted.

Primary site access for the sliplining operations is expected to be from the median between the two culverts. Access to the downstream end of Structure No. 06703 will require a temporary staging area accessible from I-395 Southbound. Access to the upstream end of Structure No. 06704 will require a temporary staging area accessible from I-395 Northbound. Minimal dewatering activities will be required at both the inlet and outlet of each culvert.

Montville Site:

Both existing culverts are 72-in single span corrugated steel pipes. The culvert ends include concrete headwalls, wingwalls, and cutoff walls. The length of Structure No. 06731 is 167-ft and Structure No. 06732 is 130-ft.

The March 2011 inspection performed on Structure No. 06731 identified several deficiencies. The steel pipe has heavy laminar rust at several bolts, a loss of asphaltic coating above the waterline with moderate corrosion below it, and two large perforations. Scour is present at the inlet, exposing the cutoff wall. Both headwalls contain several hairline cracks and map cracks with efflorescence. At the outlet there is a spall on the headwall. There is also a large amount of standing water in the pipe and around the inlet and outlet. There is vertical and horizontal deformation in the culvert.

The overall rating of the culvert and headwalls for Structure Number 06731 is 5.

The February 2012 inspection performed on Structure No. 06732 identified several deficiencies. The steel pipe has a full length band of heavy laminar rust below the waterline on both walls, heavy laminar rust on the erection bolts, large areas of corrosion, several large perforations with loss of fill, and a loss of asphaltic coating at and below the waterline. The entire length of the barrel appears to have settled by as much as 6-in. In the headwall there are vertical and map hairline cracks with efflorescence. Both wing-type endwalls contain large spalls, efflorescence, scale, and cracks. There is also a large amount of standing water in the pipe and around the inlet and outlet. There is vertical and horizontal deformation in the culvert.

The overall rating of the culvert and headwall for Structure Number 06732 is 3.

This project will include steel pipe rehabilitation, headwall repairs, and inlet and outlet protection. Both structures will be sliplined with a 62-in Corrugated Aluminum Pipe (Smooth Interior) – 10 Gauge. The existing channel at the inlet and outlet of both structures will also be lined with intermediate riprap. The wing type endwalls at the inlet and outlet of both structures will be repaired (spalls).

Primary site access for the rehabilitation is expected to be from the median between the two culverts with access provided from I-395 Southbound. Access to the downstream end of Structure No. 06731 will require a temporary staging area accessible from I-395 Northbound. Access to the upstream end of Structure No. 06732 will require a temporary staging area accessible from I-395 Southbound. Water handling will be required at the inlet and outlet of both culverts.

PUBLIC UTILITIES: The following utility has a facility within the project limits:

- Spectra Energy – Joseph R. Bruno, Area Supervisor 617-281-3984
  Kyle Neilson, Sr. Right of Way Specialist 860-894-1609

Spectra Energy is the custodian of a 6-in gas line encased in a 10.75-in steel casing. Spectra Energy provided the Department with a copy of the design plan/profile sheet (dated 04-21-55) for the existing gas line. This gas line is located between 14-ft and 16-ft below I-395, it traverses under the existing I-395 Northbound and Southbound lanes and the proposed temporary median haul road. Proposed activities include installation of I-beam posts for three-cable guide railing along the I-395 Northbound shoulder, I-beam posts for the I-395 Southbound shoulder, and the grading (fill) of the temporary median haul road.

Spectra Energy acknowledged that the proposed activities for this project will not impact their facility.

SALVAGE: Metal Beam Rail has been determined to be salvageable.

ENVIRONMENTAL PERMITS:

Thompson Site:

Inland Wetlands & Watercourse: Approved on March 13, 2013

U.S. Army Corp of Engineers: Approved on May 13, 2013

Montville Site:

The Inland Wetlands & Watercourse and U.S. Army Corp of Engineers permits were submitted on April 10, 2013 and April 13, 2013, respectively. These permits are still pending; therefore a Permit Waiver Request was obtained on August 19, 2013. The Office of Environmental Planning has prioritized this project on the Department of Energy and Environmental Protection's list and anticipates the Inland Wetlands & Watercourse Permit will be approved by the scheduled bid opening date of January 8, 2014. It is also anticipated that the U.S. Army Corp of Engineers permit will be approved by the scheduled bid opening date.

HISTORIC AND ARCHAEOLOGICAL CONCERNS:

The State Historic Preservation Office has determined that the project will have no effect on archaeological or architectural resources listed in the National Register of Historic Places.

RIGHTS OF WAY: No Rights of Way acquisition is required for this project.

CONSTRUCTION CONSIDERATIONS:

Site Access:

The majority of this project should present no unusual site access concerns. Proposed work may be accomplished from within the existing right of way.

Traffic Management (Maintenance and Protection of Traffic):

Construction operations will be sequenced to minimize impacts on traffic operations. After evaluation of temporary impacts and coordination with the Office of Construction and Traffic Engineering, it was determined that this project, located on Interstate 395, will require the shifting of traffic (both Thompson and

Montville sites) and one lane closure (Montville site). The Northbound lanes (Thompson site) and Southbound lanes (Montville site) will be shifted for traffic. The truck climbing/slow lane leading into the Montville project site will be closed for the duration of the project.

The contractor, when actively working, shall maintain and protect a minimum of one 12-ft wide lane of through traffic at both the Thompson and Montville project sites.

It is anticipated that this project will not cause sustained work zone impacts or mobility impacts.

The existing culverts will be rehabilitated and accessed through construction of temporary access/haul roads on both sides of Interstate 395.

Water Handling:

Suggested Water Handling sequence for both the Thompson and Montville sites:

1. Pump the temporary flow at the outlet, as necessary, to drain any standing water, contained between the temporary water handling area and within the existing pipe. Drain to an acceptable level that allows the existing structure to be sliplined. This process is only permitted prior to sliplining of the structure while the ground is stabilized and no sediment is created.

2. Slipline existing pipe(s) with:

    - Structure No. 06703 – 84" Corrugated Steel Pipe Aluminized Type 2 (10 Gauge)
    - Structure No. 06704 – 76" Corrugated Steel Pipe Aluminized Type 2 (10 Gauge)
    - Structure No. 06731 – 62" Corrugated Aluminum Pipe (Smooth Interior) – 10 Gauge
    - Structure No. 06732 – 62" Corrugated Aluminum Pipe (Smooth Interior) – 10 Gauge

3. Install the temporary 24" PVC bypass pipe to bypass the flow through the construction area.

4. Install the sediment filter bag. Use the pump at the outlet to dewater the construction area at the existing pipe into the sediment filter bag.

5. Construct bulkheads and grout the annular space between the existing pipe and the proposed sliplined material.

6. Construct riprap channel protection at the inlet and outlet of each structure.

7. Repair spalls on wing type endwalls at the inlet and outlet of Structure Nos. 06731 and 06732.

Specialized Equipment and/or Construction Method:

Typical construction equipment and methods are anticipated for the majority of this project.

SUBMITTED BY:
HIGHWAY DESIGN UNIT